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(54) Kerb climbing device for a wheeled vehicle

(57) A wheelchair pushchair, pram, load-carrying trolley or the like comprises two wheels (1), each mounted to the vehicle by means of rotatable caster means (2, 3). It is fitted with a device comprising at least one kerb-climing arm (4) mounted to each caster means (2, 3) to be rotatable therewith (and therefore with the wheel (1)). Each arm (4) is pivotally mounted at or adjacent one end thereof to a point of the caster means (3) and the other end is provided with a foot (9) disposed to contact a kerb but not contact the ground during travel on level ground. Each caster means (2, 3) may be provided with two kerb-climbing arms (4), one on each side of the wheel.

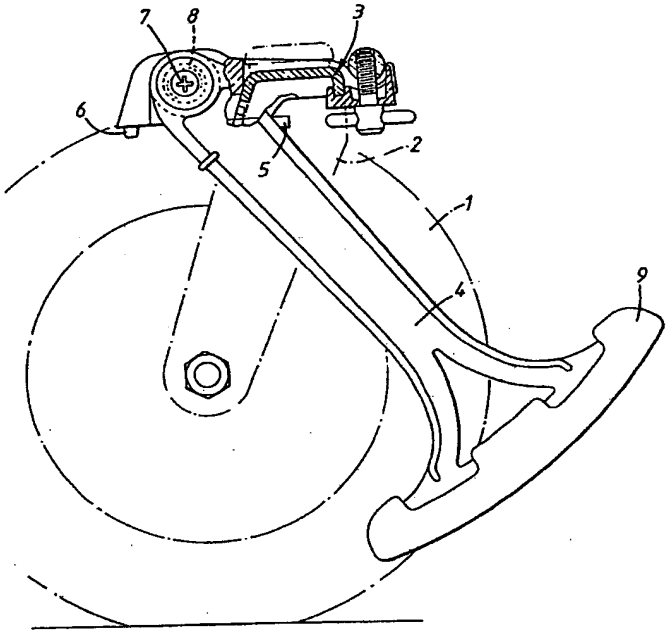

FIG. 1.

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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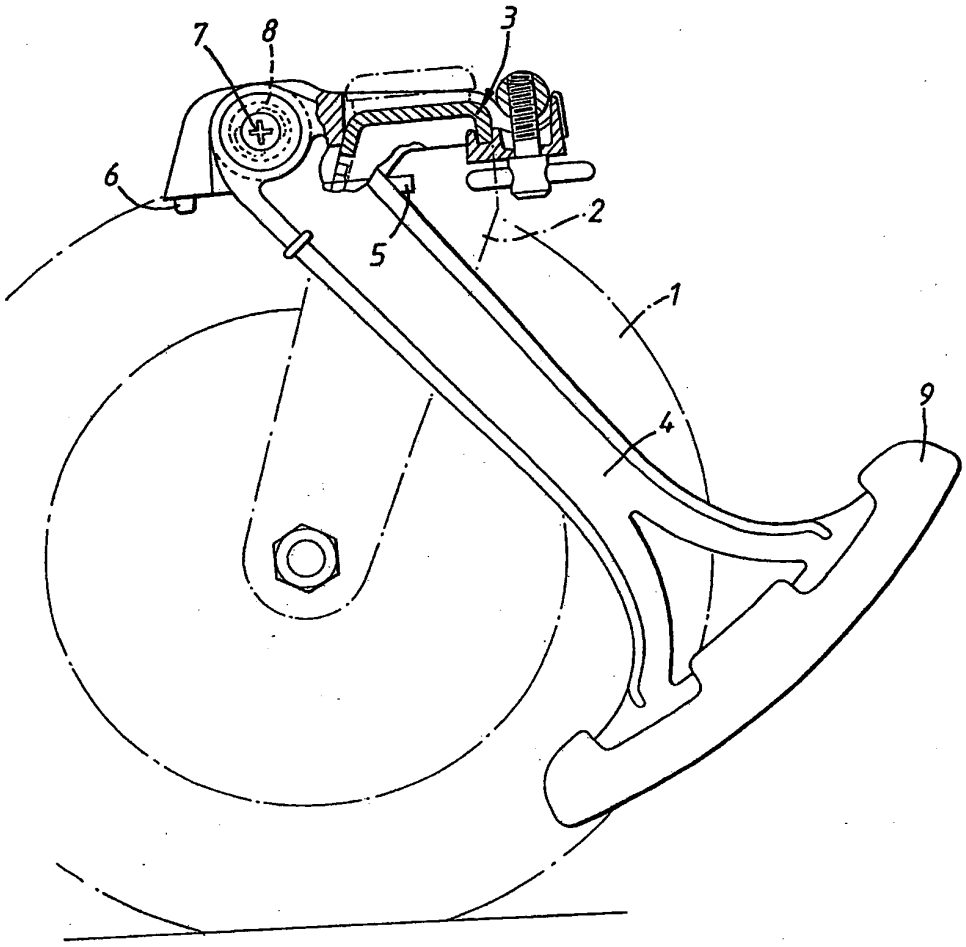

FIG. 1.

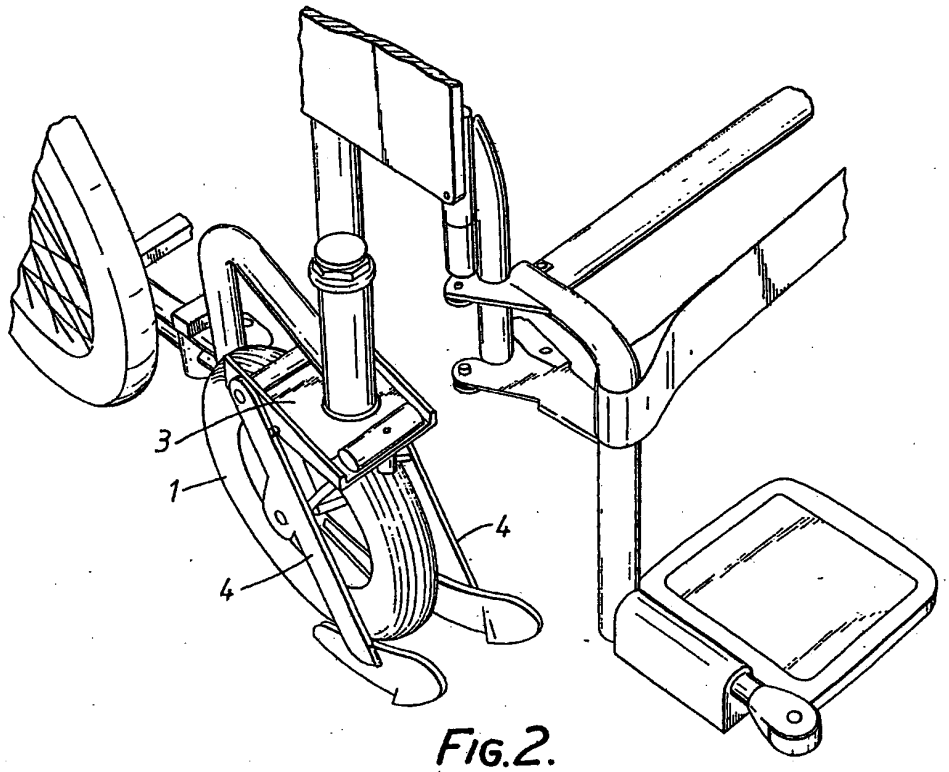

FIG.2.

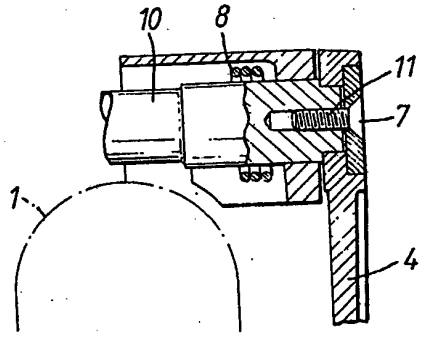

FIG.3.

SPECIFICATION

Improved wheeled vehicle

The present invention relates to wheeled vehicles, particularly but not exclusively wheelchairs.

For the sake of convenience, the term wheelchair will be used hereinafter and this term shall be taken to include pushchairs, prams, load-carrying trolleys and the like. The invention is concerned with providing such wheeled vehicles with a device to enable them to negotiate an obstacle such as a kerb stone.

It is known, for example from British patent specification no. 1569166 to provide a wheelchair with kerb-climbing attachments. The wheelchair disclosed is of the conventional type with two large diameter rear wheels and two small diameter front caster wheels. Attached to the frame of the wheelchair near the front caster wheels are two kerb-climbing pivotable struts. These attachments are biased into a position extending forwardly of the wheelchair so that when they encounter a kerb or the like, they aid lifting of the front wheels onto the kerb. Since the lifting attachments project forwardly of the wheelchair, they are often a hindrance and the above patent proposes that they may be folded out of the way when their use is not required. This is clearly a disadvantage in that either the attachments are not in position when they are required and must be manipulated to the ready position, which may not always be easy for the occupant of the wheelchair, or they are in position in which case they may inconvenience the occupier of the wheelchair.

Another disadvantage of this type of attachment is that during the lifting phase of the front wheels, the caster wheels are free to rotate and may turn sideways onto the kerb such that the wheelchair is brought to an abrupt stop when the caster wheel hits the kerb.

Another proposal is disclosed in British patent application 2145983 where a single lifting arm is disposed mid-way between the wheels at the front of the wheelchair. This projects forwardly less than the above, but still suffers from the disadvantage of allowing rotation of the caster wheels, and from the additional disadvantage that during the lift phase, the wheelchair is balanced only on three points and is not entirely stable.

It is an object of the present invention to provide a device for use with a wheelchair which overcomes the disadvantages and which may easily be fitted to the wheelchair or removed therefrom, preferably without the use of specialised tools.

According to the present invention there is provided a device for a wheelchair of the type comprising two wheels, each mounted to the wheelchair by means of rotatable caster means, the device comprising at least one kerb-climbing arm mounted to each caster means to be rotatable therewith (and therefore with the wheel), each arm being pivotably mounted at or adjacent one end thereof to a point of the caster means and having at the other end a foot disposed to contact a kerb but not contact the ground during travel on level ground.

Preferably each caster means is provided with two kerb-climbing arms, one on each side of the wheel.

Preferably each arm is biased into a kerb contacting disposition by spring means, advantageously a helical spring coiled about a pivot axle of the arm.

Each foot may be arcuate and may comprise microcellular polyurethane.

The or each arm may be of length less than the diameter of the associated wheel and be mounted to the caster means at a point thereof just above the upper, in use, circumference of the wheel.

An embodiment of the present invention will now be more particularly described by way of example and with reference to the accompanying drawings, in which:

FIGURE 1 is a side elevation of a caster fitted with a device embodying the invention;

FIGURE 2 is a perspective view of a portion of a wheelchair showing a caster fitted with two such devices; and

FIGURE 3 is a scrap cross-sectional view showing the pivot attachment of the device.

Referring now to the drawings, there is shown one front wheel 1 of a wheelchair. The wheel 1 is journalled at its centre to a pair of caster forks 2, being fixed to a caster 3 at a point, in use, forwardly of the wheel centre. Each caster is then rotatably connected in a standard manner to the wheelchair.

Removably attached to the caster 3 are a pair of quadrant arms 4, one on each side of the wheel. Each arm 4 is free to rotate about its pivot point 7 at one end between a pair of stops 5 and 6. The arm is normally biased into contact with forward stop 5 by means of a helical spring 8 coiled around a pivot axle 10. This axle 10 may be continued through the caster so that both arms 4 pivot together. Alternatively, each may pivot separately.

At the lower end of each quadrant arm 4 is a microcellular polyurethane foot 9. This is shaped as a segment of a circle, substantially centred on the pivot point 7. Adjacent the foot 9, the quadrant arm 4 is shaped adequately to support the foot 9 and to transmit forces from any part thereof along the arm.

The length of the arm and the position of the forward stop 5 is such that the arm, in its ready position, extends just forwardly of the wheel. In this position, as can best be seen from Figure 2, it is unlikely to inconvenience the user of the wheelchair. When the foot 9 encounters a kerb, it is pivoted backwardly

until the wheel 1 itself encounters the kerb and rides over the edge. Since the arm 4 is insufficiently long for the foot 9 to contact the ground in normal level travel, the arm is then pivoted back to its ready position under the influence of spring 8. The arm 4 is unlikely to contact the rearward stop 6 until the foot catches on e.g. long grass or the like.

Since the arms 4 swivel with the caster 3 and therefore with the wheel 1, there is no danger of the caster wheel turning during the lifting phase. It will always be aligned with the arms. This is made even more certain by the provision of the pair of arms, one on each side of the wheel. The kerb-climbing device is easily removed from the wheelchair if it should be required by removal of screw 11 from the pivot axle 10. Addition of the device or devices to the wheelchair does not increase the overall width nor length of the wheelchair and thus causes the least possible inconvenience to the user of the wheelchair. Furthermore, there is no requirement for a non-use position since the use position is so convenient. Provision of lifting devices on each caster wheel increases the stability of the wheelchair over and above that which will be provided by having a single centrally mounted device.

CLAIMS

1. A device for a wheelchair of the type comprising two wheels, each mounted to the wheelchair by means of rotatable caster means, the device comprising at laast one kerb-climbing arm mounted to each caster means to be rotatable therewith (and therefore with the wheel), each arm being pivotally mounted at or adjacent one end thereof to a point of the caster means and having at the other end a foot disposed to contact a kerb but not contact the ground during travel on level ground.

2. A device as claimed in claim 1, wherein each caster means is provided with two kerb-climbing arms, one one each side of the wheel.

3. A device as claimed in either claim 1 or claim 2, wherein the or each arm is biased into a kerb contacting disposition by spring means.

4. A device as claimed in claim 3, wherein said spring means comprises a helical spring coiled about a pivot axle of the arm.

5. A device as claimed in any one of the preceding claims, wherein the or each arm is of length less than the diameter of the associated wheel and is mounted to the caster means at a point thereof just above the upper, in use, circumference of the wheel.

6. A device as claimed in any one of the preceding claims, wherein the or each foot is arcuate.

7. A device as claimed in any one of the preceding claims, wherein the or each foot comprises microcellular polyurethane.

8. A device for a wheelchair substantially as described herein with reference to the accompanying drawings.

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